# 6973

# Beam Power Tube

**9-PIN MINIATURE TYPE**

**For High-Fidelity Audio-Amplifier Applications**

## GENERAL DATA

**Electrical:**

| | | | |
|---|---|---|---|
| Heater, for Unipotential Cathode: | | | |
| Voltage (AC or DC) | 6.3 ± 10% | | volts |
| Current at 6.3 volts | 0.45 | | amp |
| Direct Interelectrode Capacitances:[o] | | | |
| Grid No.1 to plate | 0.4 | max. | μμf |
| Grid No.1 to cathode & grid No.3, grid No.2, and heater | 9 | | μμf |
| Plate to cathode & grid No.3, grid No.2, and heater | 6 | | μμf |

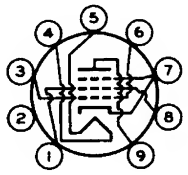
**Characteristics, Class $A_1$ Amplifier:**

| | | |
|---|---|---|
| Plate Voltage | 250 | volts |
| Grid-No.2 Voltage | 250 | volts |
| Grid-No.1 Voltage | -15 | volts |
| Plate Resistance (Approx.) | 73000 | ohms |
| Transconductance | 4800 | μmhos |
| Plate Current | 46 | ma |
| Grid-No.2 Current | 3.5 | ma |
| Grid-No.1 Voltage (Approx.) for plate μa = 100 | -40 | volts |

**Mechanical:**

| | |
|---|---|
| Operating Position | Any |
| Maximum Overall Length | 3-1/16" |
| Maximum Seated Length | 2-13/16" |
| Length, Base Seat to Bulb Top (Excluding tip) | 2-7/16" ± 3/32" |
| Maximum Diameter | 0.750" to 0.875" |
| Dimensional Outline | See *General Section* |
| Bulb | T6-1/2 |
| Base | Small-Button Noval 9-Pin (JEDEC No.E9-1) |
| Basing Designation for BOTTOM VIEW | 9EU |

Pin 1 - Grid No.2
Pin 2 - No Connection
Pin 3 - Grid No.1
Pin 4 - Heater
Pin 5 - Heater




Pin 6 - Grid No.1
Pin 7 - Grid No.3, Cathode
Pin 8 - Grid No.2
Pin 9 - Plate

## PUSH-PULL AF POWER AMPLIFIER — Class $AB_1$

**Maximum Ratings,** *Design-Maximum Values:*

| | | | |
|---|---|---|---|
| PLATE VOLTAGE | 440 | max. | volts |
| GRID-No.2 (SCREEN-GRID) VOLTAGE | 330 | max. | volts |

← Indicates a change.

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| | | | |
|---|---|---|---|
| GRID-No.2 INPUT | 2 max. | | watts |
| PLATE DISSIPATION | 12 max. | | watts |
| PEAK HEATER-CATHODE VOLTAGE: | | | |
| Heater negative with respect to cathode | 200 max. | | volts |
| Heater positive with respect to cathode | 200▲ max. | | volts |
| BULB TEMPERATURE (At hottest point on bulb surface) | 250 max. | | °C |

**Typical Operation with Fixed Bias:**

*Values are for 2 tubes*

| | | | | |
|---|---|---|---|---|
| Plate Voltage | 250 | 350 | 400 | volts |
| Grid-No.2 Voltage | 250 | 280 | 290 | volts |
| Grid-No.1 (Control-Grid) Voltage● | -15 | -22 | -25 | volts |
| Peak AF Grid-No.1-to-Grid-No.1 Voltage | 30 | 44 | 50 | volts |
| Zero-Signal Plate Current | 92 | 58 | 50 | ma |
| Max.-Signal Plate Current | 105 | 106 | 107 | ma |
| Zero-Signal Grid-No.2 Current | 7 | 3.5 | 2.5 | ma |
| Max.-Signal Grid-No.2 Current | 16 | 14 | 13.7 | ma |
| Effective Load Resistance (Plate to plate) | 8000 | 7500 | 8000 | ohms |
| Total Harmonic Distortion | 2 | 1.5 | 2 | % |
| Max.-Signal Power Output | 12.5 | 20 | 24 | watts |

**Typical Operation with Cathode Bias:**

*Values are for 2 tubes*

| | | | |
|---|---|---|---|
| Plate Supply Voltage | 300 | 310 | volts |
| Grid-No.2 Supply Voltage | 300 | 310 | volts |
| Cathode Resistor | 230 | 270 | ohms |
| Peak AF Grid-No.1-to-Grid-No.1 Voltage | 48 | 55 | volts |
| Zero-Signal Plate Current | 80 | 77 | ma |
| Max.-Signal Plate Current | 96 | 92 | ma |
| Zero-Signal Grid-No.2 Current | 6 | 5 | ma |
| Max.-Signal Grid-No.2 Current | 14 | 14 | ma |
| Effective Load Resistance (Plate to plate) | 5500 | 6000 | ohms |
| Total Harmonic Distortion | 2 | 4 | % |
| Max.-Signal Power Output | 15 | 17 | watts |

**Maximum Circuit Values:**

| | | |
|---|---|---|
| Grid-No.1-Circuit Resistance:● | | |
| For fixed-bias operation | 0.5 max. | megohm |
| For cathode-bias operation | 1 max. | megohm |

## PUSH-PULL AF POWER AMPLIFIER — Class AB$_1$

*Grid No.2 of each tube connected to tap on plate winding of output transformer*

→ **Maximum Ratings,** *Design-Maximum Values:*

| | | |
|---|---|---|
| PLATE AND GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE | 410 max. | volts |

→ Indicates a change.

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## BEAM POWER TUBE

| | | | |
|---|---|---|---|
| GRID-No.2 INPUT | 1.75 | max. | watts |
| PLATE DISSIPATION | 12 | max. | watts |
| PEAK HEATER-CATHODE VOLTAGE: | | | |
| Heater negative with respect to cathode | 200 | max. | volts |
| Heater positive with respect to cathode | 200▲ | max. | volts |
| BULB TEMPERATURE (At hottest point on bulb surface) | 250 | max. | °C |

**Typical Operation:**

*Values are for 2 tubes*

| | *Fixed Bias* | *Cathode Bias* | |
|---|---|---|---|
| Plate-Supply Voltage | 375 | 370 | volts |
| Grid-No.2 Supply Voltage | * | # | volts |
| Grid-No.1 (Control-Grid) Voltage● | -33.5 | - | volts |
| Cathode Resistor | - | 355 | ohms |
| Peak AF Grid-No.1-to-Grid-No.1 Voltage | 67 | 62 | volts |
| Zero-Signal Cathode Current | 62 | 74 | ma |
| Max.-Signal Cathode Current | 95 | 84 | ma |
| Effective Load Resistance (Plate to plate) | 12500 | 13000 | ohms |
| Total Harmonic Distortion | 1.5 | 1.2 | % |
| Max.-Signal Power Output | 18.5 | 15 | watts |

**Maximum Circuit Values:**

| | | | |
|---|---|---|---|
| Grid-No.1-Circuit Resistance:● | | | |
| For fixed-bias operation | 0.5 | max. | megohm |
| For cathode-bias operation | 1 | max. | megohm |

o Without external shield.

▲ The dc component must not exceed 100 volts.

● The type of input coupling network used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

* Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center tap (B+) so as to apply 50 per cent of the plate signal voltage to grid No.2 of each output tube.

\# Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center tap (B+) so as to supply 43 per cent of the plate signal voltage to grid No.2 of each output tube.



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## AVERAGE PLATE CHARACTERISTICS

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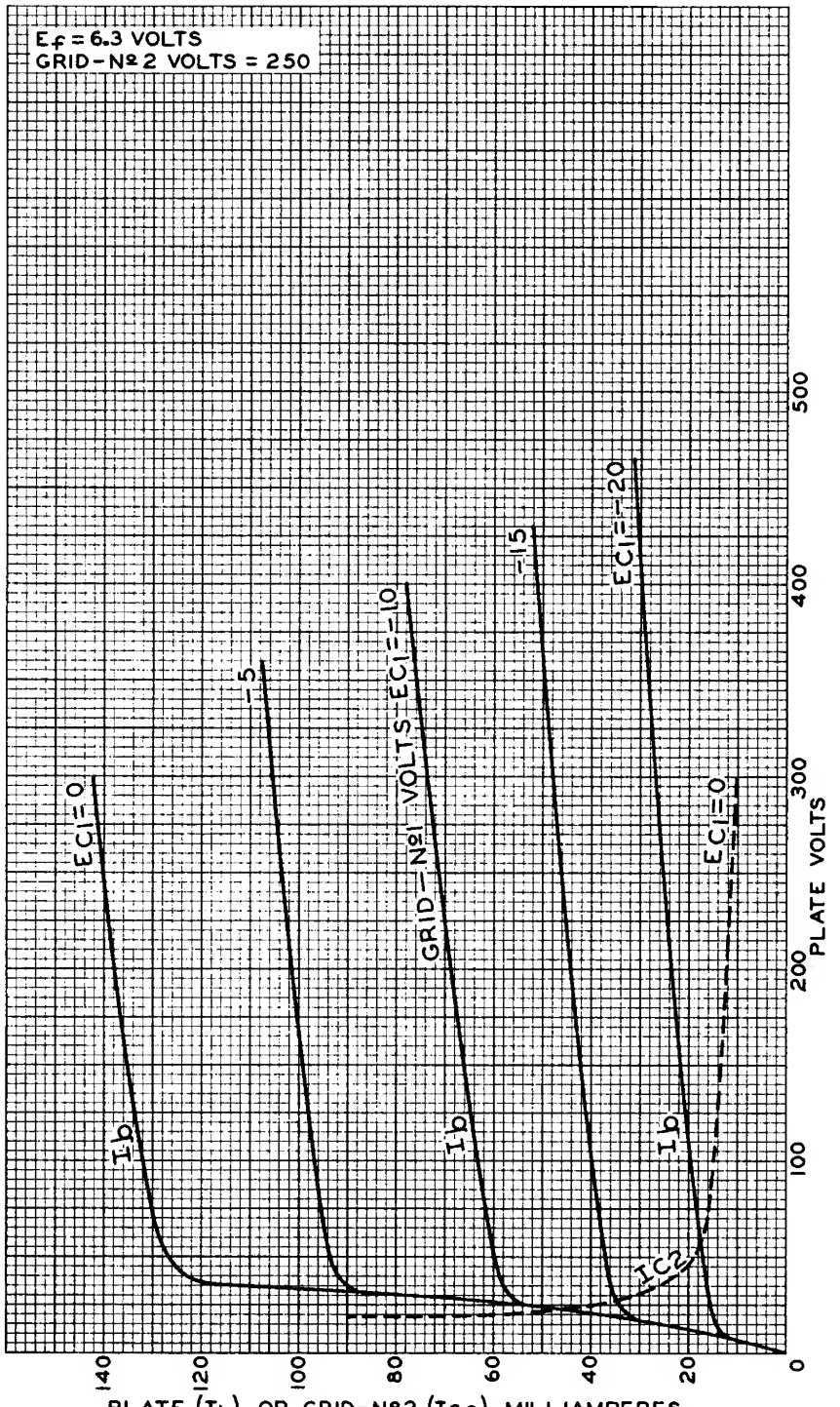
# AVERAGE CHARACTERISTICS

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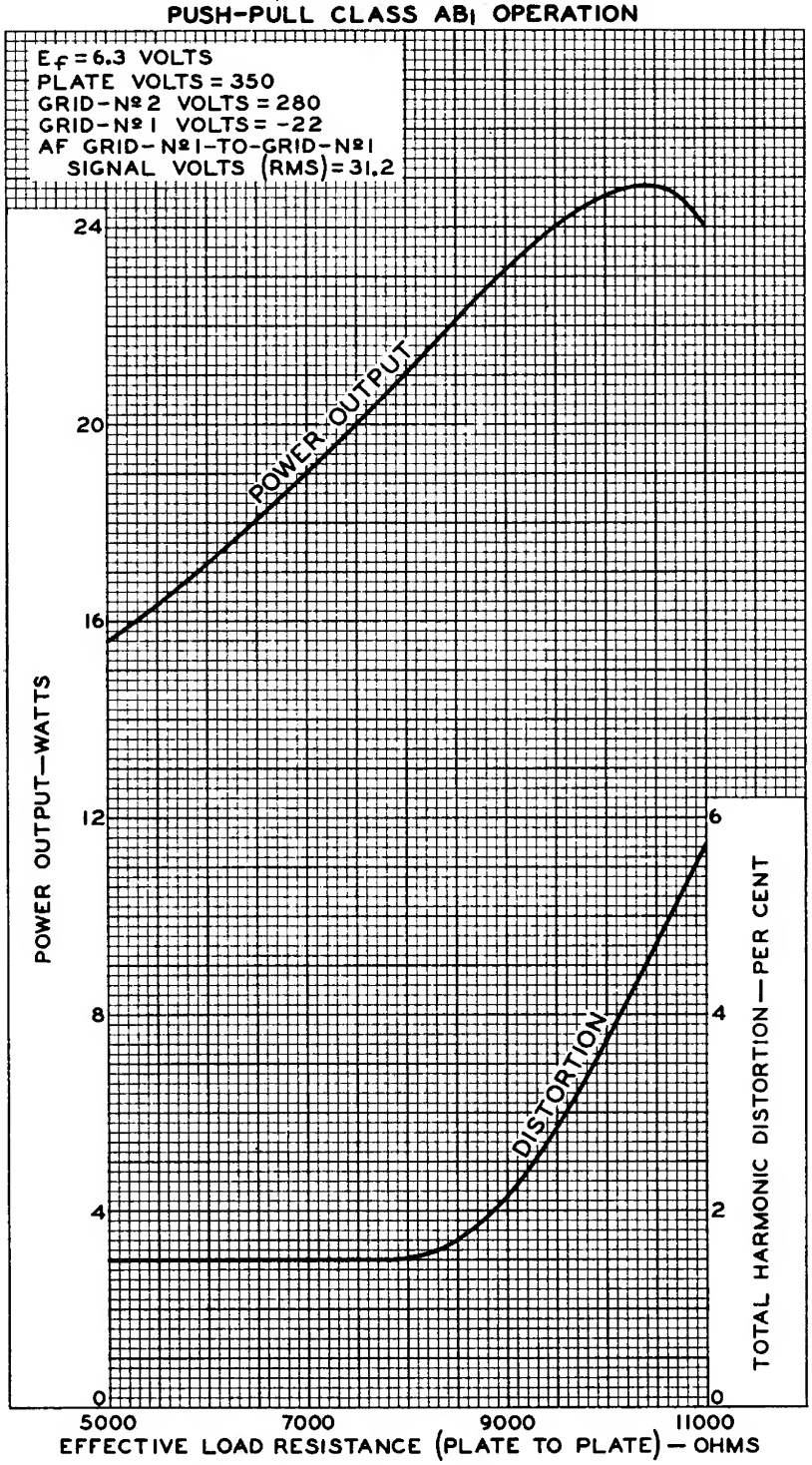
# OPERATION CHARACTERISTICS

## PUSH-PULL CLASS AB1 OPERATION





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